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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/708,100	11/01/2000	John M. Pinneo	P1-007	9615

7590 01/21/2003
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EXAMINER

VO, HAI

ART UNIT	PAPER NUMBER
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1771

DATE MAILED: 01/21/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/708,100

Applicant(s)

PINNEO ET AL.

Examiner

Hai Vo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 12-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Election/Restrictions

1. This application contains claims 12-27 drawn to an invention nonelected with traverse in Paper No. 7. A complete reply to the final rejection must include cancelation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4-6, 7, and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozmat (US 6,196,307) in view of Galloway (US 5,322,116) as applied to claims 1 and 6, in view of Saito et al (US 6,361,857) or Herb et al (US 5,316,842). Ozmat discloses a heat exchanger comprising a metallic foam being deposited with CVD diamond (column 4, lines 25-27). The metallic foam has a network of ligaments which form numerous open cells (column 3, lines 5-7). The porosity of the foam is sufficient to permit continuous flow of fluid coolant (column 4, lines 16-18). Ozmat fails to disclose a non-metallic framework material substrate. Galloway teaches a heat exchanger having the heat in the effluent gases exiting the reactor absorbed by ceramic foam block both by convection and radiation (column 5, lines 5-10). Galloway discloses the ceramic foam being highly porous to allow the gas to flow along the edge portion with relatively low flow resistance (column 3, lines

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37-41). It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the metallic foam by the ceramic foam as taught in Galloway motivated by the desire to obtain the heat exchanger that is relatively lightweight, strong and well suited to withstand the thermal cycling of the system. With regard to claims 4 and 9, Ozmat is silent as to a thickness of the diamond and surface roughness of the diamond. Saito teaches the diamond having a thickness of 24 microns (column 10, line 66). Herb discloses the diamond having a thickness of 25 microns (column 10, line 10). However, such a variable would have been recognized by one skilled in the art to economize the cost of the production and control the degree of the adherence between the thin diamond layer and the substrate with the minimized warping effect. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the diamond having a thickness instantly claimed since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With regard to claims 5 and 10, since the heat exchanger of Ozmat as modified by Galloway and Saito or Herb is made of the same material and structurally the same as the presently claimed article i.e., both articles comprising diamond deposited on a porous substrate. It is the examiner's position that the coalescence of the diamond film would have been inherently present in the heat exchanger.

With regard to claim 11, Ozmat discloses a heat exchanger wherein the foam having between 5 to 100 voids per inch (claim 29). However, such a variable would have been recognized by one skilled in the art to allow the tailoring of the flow resistance, thermal performance and structural compliance of the foam. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the foam having a porosity claimed since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

4. Claims 3, 8 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozmat (US 6,196,307) in view of Galloway (US 5,322,116) as applied to claims 1 and 6, in view of Saito et al (US 6,361,857) or Herb et al (US 5,316,842). The combination of Ozmat and Galloway does not disclose an intermediate layer between the substrate and diamond film. Figure 17 of Saito shows that an intermediate SiC layer **32** disposed between the diamond film layer **31** and a porous substrate **26**. Herb discloses the substrate being coated with a layer of a second material (column 7, lines 65-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have included an intermediate layer between the substrate and the diamond layer motivated by the desire to improve the adherence between the substrate and the diamond layer.

Response to Arguments

5. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.
6. The art rejections in Paper no. 5 have been overcome by the present amendment and response.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (703) 605-4426. The examiner can normally be reached on Tue-Fri, 8:30-6:00 and on alternating Mondays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (703) 308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

HV
January 9, 2003



TERREL MORRIS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700